

COMPILER APPARATUS AND METHOD FOR OPTIMIZING LOOPS IN A COMPUTER PROGRAM

ABSTRACT OF THE DISCLOSURE

5 A profile-based loop optimizer generates an execution frequency table for each
loop that gives more detailed profile data that allows making a more intelligent decision
regarding if and how to optimize each loop in the computer program. The execution
frequency table contains entries that correlate a number of times a loop is executed each
time the loop is entered with a count of the occurrences of each number during the
execution of an instrumented instruction stream. The execution frequency table is used to
10 determine whether there is one dominant mode that appears in the profile data, and if so,
optimizes the loop according to the dominant mode. The optimizer may perform
optimizations by peeling a loop, by unrolling a loop, and by performing both peeling and
unrolling on a loop according to the profile data in the execution frequency table for the
loop. In this manner the execution time of the resulting code is minimized according to
15 the detailed profile data in the execution frequency tables, resulting in a computer
program with loops that are more fully optimized.